

Area of study

Your child will ... (Knowledge)

Your child will be able to... (Skills)

## Autumn Term

Mathematical measures

- Be able to tell the time using an analogue clock
- Recognise standard units of measurement for mass, length, time and money
- Use mathematical equipment such as rulers and protractors to measure line segments and angles accurately. This will include the use of metal rulers that students will use in technology subjects and noticing the difference between the types of ruler.
- Introduce the use of a scientific calculator and how to use this to assist in more complex calculations together with the operation of the calculator functions.
- Appreciate the use of scale in real life in contexts such as maps, plans and elevations and why a scale is important for working with such documents. Make connections to work in subjects such as Geography, Technology

- Convert between standard units of measurement for time, length, area, volume/capacity and mass
- Solve problems involving the use of scale in real life scenarios
- Use a pair of compasses to construct accurate drawings including perpendicular bisectors and angle bisectors.

Properties of number

- Understand and recognise different categories of number including odd and even
- Recognise and calculate square and cube numbers, introduce writing with indices
- Understand the properties of prime numbers and be able to calculate and state whether a number is prime or not
- Recognise and use vocabulary such as integer, reciprocal, product, common, consecutive
- Recognise factors of numbers by finding the product of 2 integers
- Make connections between multiples and times tables

- Calculate the lowest common multiple of two numbers by listing their multiples
- Calculate the highest common factor of two numbers by listing the factors

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## Autumn Term

Place value and calculations

- Revisit methods for adding and subtracting numbers of different size
- Revisit methods for multiplication and division including numbers with remainders and how these can be written as fractions
- Calculate with indices with a power greater than 3
- Understand negative numbers and how to calculate with them, revisit adding and subtracting and introduce multiplying and dividing. Include use of a number line to support with calculations
- Introduce the use of a calculator and the main functions for more complex calculations
- Use mathematical language of integer, ascending, descending, decimals

- Use place value to multiply and divide integers by 10 or 100
- Use the hierarchy of operations (BIDMAS) in calculations including decimals to 2 places

Fractions, decimals and percentages

- Understand the concept of a proper fraction being a number that is between 0 and 1 and that improper fractions are greater than one
- Use the language of fractions - numerator, denominator, improper
- Recognising and understanding equivalent fractions are equal to each other
- To simplify fractions by using knowledge of common factors to cancel down
- Use prior knowledge of adding and subtracting fractions and apply to improper fractions
- show that an integer can be converted to a fraction and how this links to converting between mixed numbers and improper fractions
- Look at common conversions between fractions, decimals and percentages
- Correctly order decimal values by magnitude
- Calculate percentages of amounts both with and without a calculator

- Convert between mixed numbers and improper fractions
- Add and subtract fractions including mixed numbers
- Calculate fractions and percentages of amounts
- Order numbers which are provided in different formats by converting between fractions, decimals and percentages

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## SpringTerm

Fractions, decimals and percentages

- Understand vocabulary and that perimeter is the distance around the outside of an object and is measured as a unit of length
- Understand that area is the surface of a 2 dimensional shape
- Apply formula for calculating area of rectangles, parallelograms, triangles and see the relationship between each and the corresponding calculations.
- Know the properties of different types of triangle to include equilateral, isosceles and scalene and how these properties can help with area problems.
- Investigate how more complex shapes can be partitioned into known shapes to calculate areas

- Calculate the perimeter of compound shapes
- Calculate the area of shapes including rectangles, parallelograms and triangles
- Solve problems to find missing lengths when given area of a shape

Algebra

- Understand that numbers can be replaced with symbols
- Know vocabulary e.g. variable, term, expression
- Understanding inverse operations, and using this to find unknown values
- Know the difference between an expression and an equation and that an equation can be solved
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- Manipulate expressions
- Able to simplify expressions
- Convert simple worded problems to algebraic forms
- Substitute values into simple equations and solve them
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### Spring Term

#### Averages

- Know the key vocabulary of averages – mode, median, mean and range
- Calculate with lists of numbers
- Know how to calculate the mode, median and mean from a list of data and then frequency tables
- Know what the range represents as a spread of data and how to calculate
- Understand the meaning of averages and why and how we use them
- Know why one average may be more appropriate than others in certain calculations
- Make the connection between calculating the mid point of two numbers in any mathematical context is the same as finding the mean of two numbers

- Calculate all averages (mode, median and mean) from a list of data
- Calculate all averages from tabulated data
- Calculate the range of a set of data
- Start to compare distributions of two or more sets of data with reference to an average (Mode, median or mean) and a measure of spread (range or inter quartile range)

#### Sequences

- Understand how sequences of numbers are generated using different rules – adding (arithmetic both linear and quadratic), multiplying (geometric), fibonacci style sequences
- Spot patterns in numbers and describe what is happening in the pattern to create a sequence
- Describe mathematically how to move from one term to the next

- Generate sequences of numbers in a variety of situations, for example increasing and decreasing, using integers, fractions decimals.
- Explain how to continue both a arithmetic and geometric sequence
- Recognise and create sequences visually
- Start to identify the general (nth) term rule of sequences

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## Summer Term

<p>Graphs</p>	<ul style="list-style-type: none"> <li>• Understand the vocabulary of graphs, eg coordinates, quadrants, gradient, intercept</li> <li>• Understand which axis is x and which axis is y</li> <li>• Know how to plot coordinates using x and y values in all 4 quadrants</li> <li>• Substitute values into given equations to generate coordinates</li> <li>• Discover that generating a table of values for one function will generate a series of coordinates that can be joined to create the corresponding graph.</li> <li>• Make connections between the table of values and the formation of a sequence from the previous unit</li> <li>• Generate <math>x=</math>, <math>y=</math> and <math>y=x</math> graphs</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Use and interpret coordinates in all 4 quadrants</li> <li>• Plot graphs of linear functions in the form <math>y=mx+c</math> by substituting values into the equation</li> <li>• Calculate the mid point between 2 pairs of coordinates and link to averages</li> </ul>
<p>Ratio</p>	<ul style="list-style-type: none"> <li>• Understand the term ratio is comparing how much of one item you have relative to another</li> <li>• Knowing the vocabulary and mathematical notation for ratios eg : means to</li> <li>• Spotting common factors between ratios to assist with simplifying</li> <li>• Calculating ratios to find where <math>n:1</math> or <math>1:n</math> to visualise how much of the other part you have</li> <li>• Understanding that ratios in their simplest form must include integers, but when writing a ratio in the form <math>1:n</math> or <math>n:1</math> they can include non integer values</li> <li>• Sharing an amount by a ratio (this may include use of bar models)</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Simplify a ratio so that it can be stated in its simplest form</li> <li>• Divide an amount into a ratio</li> <li>• Apply the division of ratios into different contexts such as money, weights etc</li> </ul>

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Proportion

- Understand the term proportion and that mathematically we are comparing the part of something, relative to the whole
- Understand that to calculate numbers that are in proportion we will be multiplying and dividing and not adding and subtracting so as to keep values proportionate to one another
- Calculate the relationship between two values to see how they increase relative to one another
- Look at how to calculate one part and then multiply by the final required total to find the overall value. (Unitary method)
- Use answers from the unitary method to then calculate other values and start to compare between different products.

- Apply relevant methods including the unitary method to solve problems involving directly proportional relationships
- Start to look at comparing proportional relationships to make comparisons (best buys)

Transformations

- Understand the vocabulary of transformations including rotation, reflection, translation, enlargement
- Recognise shapes and how they appear when they are in different orientations but that they remain the same shape
- Revisit the use of coordinates for centres and the use of drawing  $y=$  and  $x=$  graphs for mirror lines
- See how the relative distance of a point to the mirror line is the same on either the image or reflection
- Describe translations using up, down, left and right and investigate how to describe these with vector notation
- Consider rotating shapes, how we can describe in terms of parts of a turn, and link to degrees. Reference to use of a clock for turns being clockwise and anti clockwise
- Recognise that an enlargement can increase or decrease the size of a shape

- Be able to describe and or draw a translation of a shape upon a scaled axis
- Be able to describe and or draw a rotation on a scaled axis involving 4 quadrants
- Reflect shapes in horizontal and vertical mirror lines
- Use scale factors to produce enlargements and recognise that they are mathematically similar